

EQUITY CROWDFUNDING: KNOWLEDGE AND THE SELECTION OF NEW VENTURE INVESTMENTS

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ABSTRACT

Equity crowdfunding has become a popular method for new ventures to raise money by accessing a crowd of potential investors that contribute small amounts of capital in return for equity ownership. This research provides a theory and empirical support to explain how the crowd's knowledge affects the types of opportunities that are likely to be selected by the crowd. Drawing on absorptive capacity from organizational learning theory, the research develops and tests a model of equity crowdfunding that explains how inherited knowledge and investment experiences will affect the selection of new venture investment opportunities through the development of the crowd's absorptive capacity. Furthermore, the research suggests that technology and memory decline limit the absorptive capacity of the crowd because they reduce the amount of knowledge that is available among the crowd for their decision making in uncertain conditions. The results contribute to the research in equity crowdfunding by showing the types of knowledge and limitations of knowledge the crowd is likely to experience in the development of their absorptive capacity. The model also contributes to the equity crowdfunding literature by arguing that the absorptive capacity of the crowd is a significant determinant in the types of opportunities that are likely to be successful.

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LIST OF ABBREVIATIONS

CROWDFUND	Capital Raising Online While Deterring Fraud and Unethical Non-Disclosure
FCA	Financial Conduct Authority
FINRA	Financial Industry Regulatory Authority
JOBS Act	Jumpstart our Business Startup Act
SEC	Security and Exchange Commission
SIC	Standard Industrial Classification
UK	United Kingdom
US	United States
VC	Venture Capital
VCs	Venture Capitalists
VIF	Variance Inflation Factor

CHAPTER 1. INTRODUCTION

Knowledge is a critical factor in the evaluation and exploitation of new venture investment opportunities (De Clercq and Dimov 2008; Gompers, et al. 2008; Amit, Glosten, and Muller 1990; Amit, Brander, and Zott 1998). Due to high levels of information asymmetries inherent in new venture investments, it is tough for investors to select investments without knowledge related to the focal opportunity (Cumming, Pandes, and Robinson 2013). Since financial capital is essential for entrepreneurs to start and grow their new venture (Allison, et al. 2015) and outside capital is hard to attract from venture capitalists (VCs) and angels, entrepreneurs often count on alternative funding methods to meet their capital needs. Equity crowdfunding has emerged as a way for entrepreneurs who are often shunned by VCs, angel and other outside investors to access capital. The popularity of equity crowdfunding around the world has grown and is estimated to have helped entrepreneurs raise over \$1.1 billion in capital during 2014 (Massolution 2015). Although studies related to information asymmetries and investment decision making are well established in literature related to venture capital (e.g. Amit, Brander, and Zott 1998; Barry, et al. 1990) and angel investments (Van Osnabrugge 2000), relatively little is known in the emerging equity crowdfunding literature about how the crowd's knowledge affects the types of new ventures that are funded (Kim and Viswanathan 2014; Moritz, Block, and Lutz 2015). It has yet to be determined how effective the crowd is at enhancing entrepreneurial funding success in equity crowdfunding and the degree to which the crowd's knowledge affect the types of ventures selected.

Information asymmetries characterize most new venture opportunities. The opportunities that entrepreneurs seek to exploit depend on information differences within the market (Kirzner 1997; Schumpeter 1934; Venkataraman 1997). The information asymmetries arise because the entrepreneur typically knows more about the quality of the opportunity than outsiders (Sood 2003). Although information asymmetries are an important part of an entrepreneur's competitive advantage, they also have an impact on investors' decision-making processes in the form of potential adverse selection because the investors have to make investment decisions under conditions of uncertainty (Cumming 2006). Within the investment process, investors with less relevant knowledge about a focal opportunity will have higher information asymmetries and a greater difficulty in selecting opportunities because the quality of the opportunity is a challenge to evaluate when differences in information are great. Information asymmetries make it more difficult for investors to identify and reward the best opportunities (Amit, Brander, and Zott 1998).

While prior research in equity crowdfunding has focused on information distributions and communications through signals (Ahlers, et al. 2015), this study seeks to increase our understanding of how the crowd's experience and knowledge are used to select opportunities for investment. Drawing on absorptive capacity from organizational learning theory, the ability to identify, assimilate and exploit information about a new venture investment opportunity is strongly dependent on the investor's prior knowledge (Cohen and Levinthal 1990; De Clercq and Dimov 2008). Absorptive capacity is a capability to understand new information because

of prior knowledge developed through learning. The crowd's absorptive capacity manifests itself through the relationship between the crowd's prior knowledge and the information provided by entrepreneurs that results in the selection of new venture investments. Knowledge plays a critical role in the ability for the crowd to evaluate signals and information disclosed by entrepreneurs and other investors in the process of making an investment decision. Venture capitalists and angel investors are among those that rely on prior knowledge to make informed investment decisions and improve their overall performance (Gompers, et al. 2008; Van Osnabrugge and Robinson 2000; Amit, Brander, and Zott 1998). The crowd is made up of a large group of individuals with various backgrounds, educations, and experiences. It is these experiences that allows the crowd to develop capabilities in understanding the quality of the information in each investment opportunity. Consequently, the types of opportunities that are likely to be funded are dependent on the crowd's absorptive capacity.

This research develops a theoretical model to predict what types of opportunities are more likely to be financed in an equity crowdfunding context based on the absorptive capacity of the crowd. The research addresses the question of how the crowds' knowledge affects the types of opportunities funded and links these occasions to funding success. First, the research argues that investors will have prior experiences that are useful for evaluating information about an investment opportunity. This "inherited knowledge" makes investors more likely to select new venture investment opportunities when the investment is in a familiar industry because prior experience can be used to resolve information asymmetry problems.

Second, the research argues that knowledge development through prior investment experiences allows the crowd to learn new knowledge that is useful in selecting opportunities in similar ventures. Third, the research demonstrates that investors are less likely to choose opportunities that are more technologically sophisticated because evaluation and selection of these types of opportunities typically require unique and specialized knowledge. Because equity crowdfunding allows the general public to invest in new ventures, they are less likely to have the expertise necessary to eliminate information asymmetries in these types of technologically sophisticated opportunities. Finally, the research argues that given the dynamic nature of the crowd's active membership and the frequent shifts in focus between different types of opportunities, knowledge developed by the crowd is likely to decline. Without robust mechanisms for sharing and storing knowledge, the crowd is liable to forget.

The research makes several theoretical and practical contributions. First, it shows capital acquisition in equity crowdfunding is partially dependent on the knowledge the crowd has access to before and during their experience on the crowd because it allows them to overcome information problems inherent in investment decisions. They use this knowledge to develop a capacity to evaluate investment opportunities that are highly uncertain. Second, the research shows that the types of opportunities selected by the crowd are more likely to be in areas that are more familiar to the general public. The research moves beyond the widely held assumption that the public generally is not able to determine the quality of a new venture because of their lack of financial sophistication (Smith, 2014) by showing that investments

made by the crowd follow a predictive pattern based on their abilities to reduce information asymmetries in areas that are familiar to them. Finally, the research shows that factors unique to the dynamic and public nature of crowdfunding also negatively affect the ability of the crowd to develop absorptive capacity and select opportunities for investment.

Chapter two provides a background of equity crowdfunding and related crowdfunding literature. Following the background chapter, a literature review provides theory and research related to information asymmetries, investment decision making in new ventures, and knowledge development. The fourth chapter develops four hypotheses to test. The fifth chapter discusses the methodology used in the research. Following the methodology, the results of the analysis are presented in chapter six. Finally, the implication of the research on knowledge and equity crowdfunding are discussed.

CHAPTER 2. EQUITY CROWDFUNDING BACKGROUND

Very few new ventures can obtain outside capital from venture capitalists or angel investors and rely on alternative sources to meet the financial capital needs. While most entrepreneurs initially rely on personal capital or capital from family and friends to start their new venture, they often need additional capital as their new venture begins to grow. Equity crowdfunding is a nascent phenomenon that allows entrepreneurs access to the needed capital from a large crowd of investors that each typically make only small contributions to the new venture (Mollick 2014). While the term crowdfunding is ubiquitous and can define a number of alternative funding strategies that use an open call through the internet for the solicitation of capital from a group of individuals for non-equity compensation (e.g. reward, product exchange, lending, or donation), equity crowdfunding gives individuals the opportunity to make an investment in return for equity in the new venture (Belleflamme, Lambert, and Schwienbacher 2014; Schwienbacher and Larralde 2010). Because of the potential for a financial return from equity crowdfunding, this type of crowdfunding typically focuses on helping entrepreneurs access capital to start or grow their new venture, whereas non-profit sharing types of crowdfunding stereotypically fund opportunities related to art, education, and technology (Gierczak, et al. 2016). Given the incentives to make a potential return and the focus on new venture financing, equity crowdfunding has emerged as a viable source of capital for new ventures and a possible substitute to other forms of capital acquisition like venture capital for some new ventures (Schwienbacher and Larralde 2010).

Since equity crowdfunding is an emerging industry, there has been very little peer-reviewed literature focusing on this particular type of crowdfunding and how the crowd makes decisions. Most peer-reviewed crowdfunding literature has focused on peer-to-peer lending¹ (e.g. prosper.com) or reward-based crowdfunding² (e.g. Kickstarter). The one exception is Ahlers et al. (2015) which included an analysis of signals that were important in equity crowdfunding investments. While there is little research with equity crowdfunding as the particular context, there are some studies that provide insight into investment decision making in crowdfunding. The following sections review aspects of equity crowdfunding and prior research on the decision making of the crowd.

2.1 Equity Crowdfunding Regulations

In the United States (US), the enactment of equity crowdfunding legislation and the related regulation has been underway for several years. The Jumpstart our Business Startup Act (JOBS Act) was passed in 2012 and included an equity crowdfunding provision in Title III, named the Capital Raising Online While Deterring Fraud and Unethical Non-Disclosure (CROWDFUND). Title III was designed to make it easier for new and existing private ventures to raise capital from “non-accredited” investors through an online platform in exchange for equity in the

¹ Peer-2-peer lending platforms seek to provide microloans to capital seekers from crowdfunding participants that expect a share of the interest payments in return in addition to the amortization of the loan (Haas, Philipp, Ivo Blohm, and Jan Marco Leimeister. 2014. "An Empirical Taxonomy of Crowdfunding Intermediaries.").

² Reward-based crowdfunding platforms seek to provide financial capital to capital seekers from a crowd that expect a non-financial reward in return (Belleflamme, Paul, Thomas Lambert, and Armin Schwenbacher. 2014. "Crowdfunding: Tapping the Right Crowd." *Journal of Business Venturing* 29, no. 5: 585-609.).

new venture. Although the legislation was passed in 2012, the Security and Exchange Commission (SEC), which was tasked with creating the regulations, only approved the rules in October 2015.

Title III provided a new exemption to the Securities Act of 1933 (Security Act). Prior to the JOBS Act and the related regulations, when a private new venture wanted to raise capital from investors, they either had to “go public”, which is prohibitively expensive for most new ventures (Sjostrom Jr 2001), or seek one of the few exemptions to the Securities Act that made private investment possible but was limited to only a limited number of “accredited” investors (Stemler 2013). When the JOBS Act was passed in 2012, it allowed entrepreneurs to solicit publicly to investors through a provision in Regulation A. However, this type of solicitation still required disclosure with the SEC, was limited to \$5 million per year, and was expensive for most new ventures (Stemler 2013). Another exemption to the Securities Act was Regulation D. This rule made the cost of raising capital less expensive by relying on an online platform for solicitation of investments but was primarily limited to only “accredited” investors unless the entrepreneur had a preexisting relationship with the investor (Sigar 2012).

Although Title III regulations only recently passed in the US, many countries had already enacted and implemented legislation and regulation that allowed entrepreneurs with private ventures in their countries to raise capital from the general public through a crowdfunding platform. In Europe, for example, several countries including the United Kingdom (UK), Germany and Spain allowed equity crowdfunding to take place for some time already. For example, the UK’s Financial

Conduct Authority (FCA) authorized their first equity crowdfunding platform at the end of 2011. By mid-2014, there were 14 authorized equity crowdfunding platforms in the UK, ten additional applications under review and 11 firms that served as appointed representatives (Crowdfunding Review, 2015).

In the UK, the solicitation for investment in a private company can only be made to the general public through a platform. The Financial Services and Markets Act 2000 requires all businesses that operate a platform to become authorized by the FCA when providing equity crowdfunding activities. The primary role of the authorization is to safeguard investors from misleading information and unfair business practices as defined in chapter 4 of the FCA's Conduct of Business Sourcebook (Aschenbeck-Florange, et al. 2013). Similar to the US, the UK Financial Services and Markets Act 2000 allows for exemptions from costly filing disclosures when the offering made through a platform is less than €5 million in a period of 12 months.

With regulation being typically country specific, the entrepreneurs soliciting investments and the investors providing capital are usually within the same country and are limited in cross-border investments. For example, entrepreneurs using a UK crowdfunding platform are prohibited from soliciting investments from investors in the United States. Likewise, investors in the US are unable to make investments in an equity crowdfunding offers in the UK. While there are geographical limitations to making investments in new ventures through equity crowdfunding by country because of regulations, research shows that the geographic constraints within a country are more relaxed in crowdfunding, and

investors make investments at greater distances from the new venture than do traditional funding mechanisms like venture capital (Mollick 2014; Agrawal, Catalini, and Goldfarb 2011).

2.3 Platform Types

Most regulations limit equity crowdfunding to online platforms that are regulated by the governing country's regulatory authority. For example, funding platforms for equity crowdfunding in the US are defined under Title III as websites that are registered with the SEC and the Financial Industry Regulatory Authority (FINRA) for the purpose of providing equity crowdfunding activities to the general public. In the UK, the FCA regulates all equity crowdfunding platforms.

While regulations govern several disclosure and investment activities, the platforms used by entrepreneurs have characteristics that are designed to help link the entrepreneur raising capital with the crowd of investors interested in equity ownership (Belleflamme and Lambert 2014). These different characteristics of the platform impact the success of equity crowdfunding (Moritz, Block, and Lutz 2015). For example, entrepreneurs are likely to choose platforms that have a large crowd of investors because they can solicit their opportunity to more individuals at the same time (Belleflamme and Lambert 2014). Likewise, investors are likely to choose a platform that has a large number of new ventures because it allows them to find an opportunity that better meets their investment criteria and decision-making capabilities (Moritz, Block, and Lutz 2015). Given that crowdfunding relies on small contributions from a large crowd of investors (Mollick 2014) and

entrepreneurs are characterized as resource constrained, entrepreneurs need to attract a large number of investors with as little cost as possible.

On a platform, entrepreneurs connect with the crowd by creating an online profile that allows them to distribute information about the investment opportunity. Before the campaign launches on the platform, the entrepreneur decides on the valuation and sets a funding goal and equity amount offered. In addition to the amount sought and equity offered, the platforms also allow the entrepreneur to post business plans, videos, financials, and other information that an investor can use to evaluate the potential of the opportunity. The platform also typically allows communication between the entrepreneur and investors through email and public discussion boards. Entrepreneurs also try to establish additional credibility on the platform by linking their social media accounts.

Crowdfunding platforms commonly fall under two different models (Cumming, Leboeuf, and Schwienbacher 2015). First, the all-or-nothing model gives entrepreneurs the opportunity to raise capital from the crowd. However, if they do not meet their predetermined funding goal, they receive none of the money invested. The purpose of the all-or-nothing model is to limit risk by only allowing entrepreneurs access to capital when they have attracted a sufficient number of investors to fund the opportunity. The second platform type is the keep-it-all model. This model allows entrepreneurs to raise capital toward their predetermined goal but keep all of the investment regardless of whether or not the goal is reached. While both models are useful for raising money, the large amount of capital needed and the added risk of new venture investments make the all-or-nothing model in

the most likely for investors that want to limit risk (Cumming, Leboeuf, and Schwienbacher 2015). Research shows that the crowdfunding platform model affects the type of projects that are funded. Using data from two different reward-based platforms that varied in the model type, Cumming et al. (2015) showed that all-or-nothing models were more likely used by projects that were large, whereas the keep-it-all models were more often used by small projects.

The internet also makes information easier and cheaper to obtain. Because the crowdfunding campaigns take place on a web platform, the information is relatively inexpensive to access, consistent across users, and irrespective of an investor's location. The internet allows individuals within an online community to share valuable information to solve problems (Afuah and Tucci 2012). The platform capabilities are likely to allow members of the crowd to collect information with fewer resources. For example, investors access information that can be used in their funding decisions from any location when using crowdfunding platforms (Agrawal, Catalini, and Goldfarb 2011). These findings differentiated crowdfunding from venture capitalists because previous research suggested that venture capitalists invest in new ventures that were in proximity in order to reduce the risk of adverse selection and moral hazards (Lerner, 1995; Sorenson & Stuart, 2001). Conversely, crowdfunding is less reliant on gathering information in close proximity to the new venture's physical location to resolve information problems in the investment decision-making process (Agrawal, Catalini, and Goldfarb 2011). However, little is known about the issues arising from moral hazard and the ability for investors to monitor new ventures because of the greater distance of investors in crowdfunding

than in venture capital or angel investing. Regarding the reduction in information asymmetries, some features like social network connections, online updates, and discussion boards reduce the difficulties for the crowd to resolve the information problems (Mollick 2014). For example, in a crowdfunding campaign, the crowd can view discussion boards that include other investors' questions, comments, or concerns that are useful in helping them understand the quality of an opportunity.

2.4 The Crowd

In equity crowdfunding, the crowd refers to the general public (Smith, 2014) and differs from other groups of investors that use online platforms to invest as “accredited” investors (e.g. series D and angels). With equity investments in new ventures available to the public, entrepreneurs have access to a new and large source of capital to meet their financial needs. The crowd's main goal for participating in equity crowdfunding is the possibility of financial payoff (Lin, Prabhala, and Viswanathan 2013). Given the majority of the crowd are “non-accredited” investors (Authority 2015; Sood 2003), entrepreneurs will raise less capital from each investor and rely on participation from a large subset of the crowd to meet their financial capital needs (Mollick 2014). The average investment portfolio from investors participating in equity crowdfunding in the UK was £5,414 in 2014, with one-third of the investors contributing less than £1,000 (Baeck, Collins, and Zhang 2014). Despite the lack of large individual capital investments, the crowd can be vast and provide a number of new ventures with funding. For example, Crowdcube, the largest UK equity crowdfunding platform, has over 260,000 registered investors, having added 61,592 investors in 2014 and 116,845

in 2015 (Crowdcube 2015; Crowdcube 2016). With this vast crowd of investors, over 381 ventures on Crowdcube have raised more than £150 million from 2011 to the end of the first quarter in 2016.

As the crowd comprises a large number of individuals, there is likely wide variations in their backgrounds, interests, and experiences that incorporate the knowledge useful in reducing information asymmetries in new venture investment. However, given that the majority of the general public are “non-accredited” investors and are characterized as having less financial sophistication and experience relevant to new venture investments (Smith 2014), the crowd will vary in their selection of new ventures to support compared with traditional funding sources (e.g. venture capital). When the crowd determines that the venture’s opportunity has a potential return, they will invest in the new venture (Ahlers, et al. 2015). However, with ample probability of adverse selection problems occurring in new venture investments, rational investors without the ability to resolve information asymmetries will likely not invest in the new venture because their inability to reduce the risk of adverse selection will increase the probability that they will make investments in opportunities with no expected returns (Amit, Brander, and Zott 1998). For equity crowdfunding to be successful, the crowd must be able to reduce information asymmetries and have capital to make investments.

The role of investors in providing salient information to other investors to help them reduce the risk of adverse selection has frequently been studied in new venture financing literature. For example, Lerner (1994) researched the use of syndication among venture capitalist and found that venture capitalist syndicate their

investments in new ventures because it allows them to share information that is useful in determining the best quality opportunities. While he also found that venture capitalist were least likely to syndicate with other venture capitalists that were less knowledgeable because of the risk of free-riding, the crowd is more likely to share information and support with the each other when the investment requires a significant number of participants to be successful.

Research in equity crowdfunding has also provided empirical validation for the value of information provided by investors to the decision-making process. For example, Hornuf and Schwienbacher (2015) examined 8,638 comments made by investors on the public discussion board of crowdfunding campaigns and found that the comments were significantly related to funding success. Also, when they broke the comments up into types, they found that the most impactful comments for the financing of the campaign were investors that offered help to the entrepreneur, followed by suggestions for improvements and statements of investments for a second time. Similar to stock market rallies where less sophisticated investors are more likely to invest late because of the lack of knowledge or access to information, Zhang and Liu (2012) found that herding was a behavior among members of the crowd in a peer-to-peer lending platform and many lenders contribute to campaigns that were already well funded. Likewise, crowds on an equity crowdfunding platform were more likely to invest in a campaign that had almost reached their funding goal (Agrawal, Catalini, and Goldfarb 2011). The reasoning behind the herding behavior was that the crowd relied on investments by others as information to inform their investment decisions. These investments served as signals of quality

to other less informed members of the crowd. In peer-to-peer crowdfunding, the observation of other lenders' investments was used to lower the perception of default risk (Herzenstein, Dholakia, and Andrews 2011). Similarly, Kim and Viswanathan (2014) studied the role of experts in crowdfunding. They found that those investors that were considered experts had an influence on the later investments of the crowd because they were perceived to have more knowledge about the quality of the opportunity. Because experts are perceived of having more knowledge that is useful in selecting high-quality opportunities, their investments were viewed as a credible signal of an opportunity's quality. While expert investors can reduce information asymmetries by directly evaluating the claims made by the entrepreneur, the less knowledgeable investors often will benefit from the signals of other investors to inform their decisions. While each of these studies examines how information from investors affects the crowd's decisions, they do not discuss how relevant knowledge is used in determining the value of the information.

2.5 The Entrepreneur

Research also points to the value of information provided by the entrepreneur as an important factor in an investor's ability to reduce the risk of adverse selection (e.g. Ahlers, et al. 2015; Allison, et al. 2015). In equity crowdfunding, empirical evidence supports the propositions that entrepreneurs can help resolve the knowledge differences for investors by providing information. For example, researchers commonly examine how updates and comments made by entrepreneurs on the public discussion boards during a campaign serve to inform investors about the opportunity. These comments and updates affect the successful funding of a

crowdfunding campaign. Hornuf and Schwienbacher (2015) studied 89 new ventures from several German crowdfunding platforms between 2011 and 2014 to understand the dynamics of crowdfunding decisions based on information provided by the entrepreneur in the form of updates. The dynamics of the investor decision making was impacted by updates because the update served as new information that was not available at the start of the campaign. They find that entrepreneurs that post updates to the public discussion board during the campaign increase the subsequent funding of investors the next day by 17.8%.

Mollick (2014) studied Kickstarter, a popular type of non-equity crowdfunding, and found that the level of preparedness represented on the crowdfunding campaign was a signal of quality and increased the probability of successfully raising capital. In the study, he measured preparedness as the degree that the individuals seeking funds had prepared their campaigns before their launch to set of standards that included a video and updates within the first three days. Both sources of information used as proxies for preparedness of the project were significantly related to crowdfunding success. Furthermore, the study included additional measures for proxies of preparedness by measuring the number of spelling errors that were in the campaign. He found that the number of spelling errors was also significantly related to crowdfunding success or failure. These proxies served as valuable signals in the decision-making process of investors in this type of crowdfunding. In an equity crowdfunding context, Ahlers, Cumming, and Gunther (2015) also examined signals as salient information provided by an entrepreneur and the impacts on funding success. In their study of 160 new ventures participating

in equity crowdfunding in Australia, they found that entrepreneurs that provide financial statements, external certificates and information about their board of directors were more likely to achieve funding success on an equity crowdfunding site.

Similarly, Moritz, Block, and Lutz (2015) interviewed 23 participants in equity crowdfunding to determine the role of communication between the entrepreneur and the crowd in the reduction of information asymmetries. They found that entrepreneurs were unable to rely on conventional communication strategies (e.g. face-to-face contact) in interactions between the entrepreneur and the crowd because the small investment amounts from each investor made the cost of common communication strategies prohibitive. Instead, the entrepreneurs developed pseudo-communication strategies to provide salient information to the investors through online capabilities found on the platform and the media richness of online communications. Some pseudo-communication strategies entrepreneurs used in the crowdfunding campaigns included social media tools that allowed investors to view social connections, online discussion boards where updates and comments were posted, and a forum where videos were presented in the campaign. Lin, Prabhala, and Viswanathan (2013) studied 205,132 online crowdfunding campaigns in a peer-to-peer lending context to test the role of social networks on the outcomes. Although the crowdfunding platform was designed for credit and did not allow entrepreneurs to offer equity, their study found that the social network of the borrower improved their likelihood of crowdfunding success when the borrower's friends participated in the process and were visible and verifiable to other lenders

through the social network. They conclude when a lender's social network participates in the crowdfunding campaign as investors, the investments made by these individuals serves as valuable information that other investors use in their decision-making process. In sum, the information provided by entrepreneurs is crucial in the decision-making process. However, the research does not explain how knowledge plays a role in identifying what information is valuable.

CHAPTER 3. LITERATURE REVIEW

3.1 Information Asymmetries

Information asymmetries make the decision-making process of equity investments difficult for investors because they have to determine the quality of an opportunity in uncertain conditions. Akerlof's (1970) seminal work on the risks that arise from the differences in information described the impacts of information asymmetries in buying and selling used cars. Specifically, the seller of a car would try to provide information to the buyer about its quality. However, the consumer faced a problem of determining the credibility of the information disclosed by the seller because the seller could misrepresent, either deliberately or inadvertently, the actual quality of the car. The result of the information gap between the two parties led to high-quality cars being unable to attract their value because the buyer was unable to determine the vehicle's value with the limits in information. As a result, high-quality sellers left the market when they were unable to attract the correct value. When these sellers left the market, the overall quality of the market was reduced, and the equilibrium car was of poor quality. Thus, information asymmetries led to the risk of adverse selection for buyers where the equilibrium value was poor.

Although research on information asymmetries and the risks of adverse selection has been studied in various contexts (Rothschild and Stiglitz 1992; Spence 1973), the new venture financing context has a high probability of adverse selection because of the abundance of information asymmetries between investors and entrepreneurs (Amit, Brander, and Zott 1998; Cumming 2006; Gompers 1995) and

the tendency for equity investors to attract poor quality opportunities in greater numbers than other types of new venture financing (Amit, Glosten, and Muller 1990; Myers and Majluf 1984). Equity investments tended to attract a large number of poor quality opportunities because entrepreneurs did not have to provide downside protection to investors in the case of default (Cumming 2006). For an investor, there was a large risk when making an equity investment in a privately-held venture because of the high probability of failure among startups, illiquidity of equity, and lack of available information needed to evaluate the quality of the venture (Amit, Brander, and Zott 1998; Amit, Glosten, and Muller 1990; Wright and Robbie 1998). Equity rewards investors with high potential returns when a new venture is successful but provides no investment protection from the loss when the new venture fails. In a failed new venture, equity investors have the potential to lose their entire investment. In contrast to Ahler's example of high quality sellers leaving the market, the new ventures have traditionally had few alternatives to leave the market, resulting in the swelling of the market with both high and low quality opportunities. While the high quality opportunities in equity investments remain in the market, the problems related to the attraction of poor quality opportunities combined with the high information asymmetries makes it difficult for investors to sort out the high quality opportunities. As a result of the limitations to equity markets, the average return of an investment in a new venture is negative (Amit, Brander, and Zott 1998). In the presence of information asymmetries and the risk of loss, investors experience a high probability of adverse selection when making equity investments in new ventures. Investors reduce the risk of making poor equity

investments by using their knowledge to determine the quality of an opportunity from information provided by the entrepreneur (Amit, Brander, and Zott 1998).

3.2 Investment Decision Making

In new venture financing, research on investment decision making has suggested that the ability of an investor to select new venture opportunities of high quality and above average returns is based on an investor's perception of risk and return (Dimov and Shepherd 2005; Tyebjee and Bruno 1984) and their ability to decrease risks or improve returns (Amit, Glosten, and Muller 1990). Knowledge plays a major role in the decision-making process of investors by helping them reduce the risk of making poor investment decisions by resolving information asymmetry problems (Cumming 2006). For example, Amit, Glosten, and Muller (1990) found that venture capitalists and entrepreneurs were faced with the risk of adverse selection because asymmetric information problems made it more difficult for investors and entrepreneurs to negotiate the value of the opportunity. However, venture capitalists were able to reduce the risk by using their skills and experiences (MacMillan, Zemann, and Subbanarasimha 1987). Entrepreneurs were viewed as being able to better understand their abilities and the value of the opportunity compared to outside investors (Backes-Gellner and Werner 2007; Busenitz, Fiet, and Moesel 2005), while investors accessed this information from the entrepreneur or other sources (Amit, Brander, and Zott 1998; Sood 2003; Cumming 2006). Rational investors that were unable to reduce the level of information asymmetry would not invest because the risk of making poor investments was greater (Amit, Brander, and Zott 1998; Amit, Glosten, and Muller 1990). The impact of

information asymmetries suggests that the crowd needs to reduce the level of information asymmetries before making an investment. Otherwise, they are likely to select investment opportunities that have negative expected return (Amit, Brander, and Zott 1998).

Those investors that have relevant knowledge in determining the quality of the focal venture's opportunity have the potential to make investments in new ventures by resolving the information asymmetries. Amit et al. (1998) argued that venture capitalist were able to exploit their knowledge by conducting due diligence and establishing the quality of an opportunity was above a threshold that made the investment have an expected positive return. The threshold was a perception of quality that also relied on the venture capitalist's knowledge to determine. Based on the decision-making process in new venture investments, investors with these higher levels of knowledge will find new ventures to support so that entrepreneurs can exploit the opportunity. When an investor makes the investment, both the entrepreneur and investor can share in any potential future payoffs. Nonetheless, venture capitalists are less likely to participate in crowdfunding because of the risk of free riding by less informed investors that can exploit the knowledge of the venture capitalist at the venture capitalist's expense (Amit, Brander, and Zott 1998; Lerner 1994).

Not all investors with relevant knowledge have sufficient capital to invest alone, nor do they have a personal network of other investors with knowledge and capital. Instead, these investors also rely on alternative mechanisms to make investments in new ventures. By enlisting in a crowd, investors with knowledge can also depend

on the financial capabilities of other members of the crowd to meet the capital needs of a new venture. Although this type of investor is required to share in potential payoffs with other members of the crowd, they are unable to receive any portion of a payoff outside the crowd because they fail to meet the capital needs of the new venture without others. Their inability to fund the needs of a new venture alone results in failure to exploit the opportunity and receive any potential payoffs. With this logic, a knowledgeable investor with capital limitations is motivated to participate in equity crowdfunding to access potential payoffs of new venture opportunities. While an investor may have financial resources, they are limited in capital when the total amount they make available to invest in new ventures is constrained by their investment strategy. For example, a person is considered constrained if they have enough capital to fund the whole need of a new venture but chooses not to make the full investment because it will exhaust funds necessary to diversify. Those with larger amounts of capital can meet the needs of new ventures and have a diversification strategy compared to investors that are limited in their available financial capital for new venture investments and cannot fund a new venture and diversify to the same extent. Without crowdfunding, a knowledgeable investor that is capital constrained fails to invest in a high-quality opportunity with a potential positive expected payoff and loses any chance to share in potential payoffs because the entrepreneur is unable to exploit the opportunity.

Whereas investors with relevant knowledge have the potential to make an investment in a new venture by resolving information asymmetries, less knowledgeable investors do not have capabilities to make decisions that result in

above average positive returns and will likely choose not to invest (Amit, Glosten, and Muller 1990). Thus, rational investors without relevant knowledge in determining the quality of an opportunity are limited in their potential investment behavior. Crowds are less likely to fund opportunities where the crowd is comprised of investors with less relevant knowledge. With the decision-making process limiting the ability to invest, entrepreneurs are unable to exploit any opportunities and both the entrepreneur and the investor lose any chance to share in potential payoffs. In order to improve their ability to make investments, the crowd is motivated to learn. When the crowd learns from experiences, the crowd develops new knowledge that they can use in their investment decisions making process. In addition, the reduction of information asymmetries from investments that are more familiar to the crowd increases the likelihood that the investment is an opportunity that has a potential positive return.

For equity crowdfunding to be a success, the crowd needs to be motivated to participate and be able to resolve information asymmetries. While the main motivation for participating in equity crowdfunding is to obtain a financial return on an investment, the motivation does not explain why the crowd works together to resolve information asymmetries. Instead, the crowd is motivated to work together in crowdfunding to take advantage of the various resources of knowledge developed from prior experiences that help resolve information asymmetries and to access financial capital from each other. As a result, the crowd as a whole is more likely to select opportunities that have a potential positive return.

3.3 Knowledge Development and Absorptive Capacity

Cohen and Levinthal (1990) defined absorptive capacity as the capability to identify, assimilate and exploit new information to improve performance. Their theory argued that absorptive capacity was dependent on prior learning opportunities. They argued that the ability to access the value of new information was dependent on prior knowledge. They used this theory to explain how R&D spending improved an organization's capability to recognize and exploit new knowledge in the environment. While their research focused on R&D spending, innovation, and learning, the absorptive capacity construct has also been used to explain a variety of phenomenon related to strategy (Zahra and George 2002; Schilling 1998; Lane and Lubatkin 1998). Zahra and George (2002) argued that absorptive capacity was a dynamic capability that impacted a firm's competitive advantage by allowing them to better access information from their environment to improve performance. The construct has also been used in new venture financing literature to explain the performance of venture capitalists in the investments made in new ventures. For example, De Clerq and Domov (2008) studied how venture capitalists developed internal knowledge through their investment experiences. In their research on new venture financing, absorptive capacity was used to explain the capabilities of a venture capital firm to evaluate investment opportunities in uncertain conditions by relying on prior investment knowledge to inform their investment criteria. Their research suggested that prior investments provided deeper knowledge of a specific industry. This in-depth knowledge allowed the VCs to evaluate information provided by new investment opportunities with a better

understanding of the value of the information. In their research, the absorptive capacity of a venture capital firm was manifest through the evaluation and selection of investments. In addition, the uncertain conditions inherent in new venture investments were mitigated through prior investment experiences because the venture capitalists were able to gain more familiarity with the investments process when they made frequent investments in a new venture (Dimov, de Holan, and Milanov 2012)

The key to absorptive capacity is that it is founded on prior experiences that provide opportunities for learning (Cohen and Levinthal 1990; Mowery, Oxley, and Silverman 1996). An organization can develop absorptive capacity from internal knowledge development or access to external sources of knowledge (De Clercq and Dimov 2008). A primary source of an organization's absorptive capacity is made up of the existing range of knowledge that members of the organization bring with them when they join (Shane 2003). Huber (1991) referred to this type of organizational knowledge as "inherited knowledge." He suggested that an organization is significantly impacted by the kind of knowledge that individuals bring with them into an organization because it impacts the types of future experiences that the organization will use for learning. There are two ways that this range of knowledge impacts the development of an organization's absorptive capacity. First, the inherited knowledge impacts how the organization interprets new information (Shane 2000; Yu 2001). Second, the inherited knowledge impacts the exploitation of new information it acquires because it allows organizations to apply existing knowledge to new opportunities (Yu 2001). For example, existing

stocks of knowledge related to market needs allow an organization to serve those demands better (Venkataraman 1997). Within new venture financing, inherited knowledge about market demands can allow an investor to better determine the quality of an investment opportunity. While the investor does not serve the needs directly, they can invest in new ventures that meet those needs because the investor better understands the market demand.

There are several factors that impact the development of inherited knowledge within an organization (Shane 2003). For example, an organization can be made up of individuals with variations in employment characteristics like job functions (Roberts 1991; Klepper 2001), industry differences (Casson 1995; Knight 1921), and locations (Casson 1982). In addition, they can have variations in the levels of education (Shane 2003). Finally, they can have access to different degrees of social networks that provide information (Aldrich and Zimmer 1986). In equity crowdfunding, the crowd is made up of a diverse group of individuals. Each of the individuals that join the crowd brings with them a different set of experiences that comprise their inherited knowledge. No two members of the crowd are likely to have the same inherited knowledge. However, individuals in the crowd are likely to have similar experiences that collectively improve the inherited knowledge of the crowd in a specific area. For example, individuals within the crowd with different past educational experiences but similar working experiences are likely to have a greater inherited knowledge related to the work experiences than with the educational experiences. Because a crowd is made up of members with variations in their inherited knowledge, there will be differences in the types of experiences

that result in an absorptive capacity of a crowd. Consequently, the crowd is likely to develop an absorptive capacity from members' experience that are more frequently observed in the crowd.

Knowledge development is also a process of learning that results from direct experiences within the organization (Huber 1991). There are various activities that an organization can undertake to acquire new knowledge. Knowledge development comes through the process of experiential learning (Huber 1991). Organizations develop this type of knowledge through repeated experiences by individuals within the organization (Levinthal and March 1993). Typically, these repeated experiences for learning are embedded in an organization's processes and procedures (Zahra and George 2002), which helps with the transfer of tacit knowledge (Kogut and Zander 1993). For example, venture capitalists develop "rules of thumb" from prior investment experiences to increase the efficiency of processing information about an investment opportunity (Dimov, de Holan, and Milanov 2012). For example, they may only invest in new ventures that are in markets that they had previously invested in because it limits the cost and time of acquiring new knowledge about different markets. In new venture financing, prior investment experiences provide useful information that VC can use in the development of an absorptive capacity (De Clercq and Dimov 2008). For example, prior investments provide access to networks of individuals that contribute to the understanding of a particular industry that the investment is made in (Sorenson and Stuart 2001). In crowdfunding, prior investments may shape to some degree the knowledge developed because the crowd has access to new information from these investments. As a result, the absorptive

capacity of the crowd will likely be able to better identify and exploit information from new opportunities when it is related to prior investments.

3.4 Organizational Memory

While knowledge is often kept between individuals and groups through processes and procedures adopted within the organization (Zahra and George 2002; Kogut and Zander 1993), organizations can also forget (Argote, Beckman, and Epple 1990). Knowledge begins to erode over time when there are not mechanisms for hard coding, systems, or routines for storing and retrieving the knowledge (Huber 1991) or when the knowledge is not used frequently (Holan and Phillips 2004). In organizations, forgetting also occurs because of turnover or shifts in the organization's interests (Dimov, de Holan, and Milanov 2012).

One challenge of absorptive capacity within crowdfunding is the dynamic nature of the crowd. The crowd does not have the sophisticated social integration mechanisms found in complex organizations to easily store knowledge among members of the crowd. Research about the transferring of information in equity crowdfunding research has mostly suggested that knowledge is dispersed through comments and updates from investors (e.g. Ahlers, et al. 2015). While there are limits to organizational memory in equity crowdfunding that will result in some decline in the absorptive capacity of the crowd, there are also features of crowdfunding that improve the memory. First, the crowd is made up of a vast number of individuals with inherited knowledge that can be used to develop the absorptive capacity of the crowd through grafting. Grafting refers to the addition of new members into an organization. Each of these members brings with them a stock

of inherited knowledge that can be useful in evaluating the investment opportunities. Second, successful crowdfunding campaigns rely on a large number of individual investors. This large size reduces the need for knowledge transfer between members because the more members of the crowd access the knowledge through direct experiences.

CHAPTER 4. THEORY AND HYPOTHESES

Knowledge helps resolve the asymmetric information problems inherent in new venture investments when the knowledge is relevant to the focal venture's opportunity (Amit, Brander, and Zott 1998). The ability to exploit information about an opportunity and resolve the asymmetric information problems is partially dependent on prior relevant knowledge (Cohen and Levinthal 1990). An individual, organization or crowd obtains relevant knowledge through a process of learning (Levinthal and March 1993). They learn by acquiring information from direct experiences and from information about experiences of others (Huber 1991). By acquiring knowledge through learning, an entity is able or should be able to improve their absorptive capacity for identifying and exploiting new information about an investment opportunity (De Clercq and Dimov 2008).

The crowd's ability to determine the quality of an investment opportunity by identifying exploiting information about the investment opportunity is a function of the existing stock of knowledge individuals in the crowd obtained before participating in crowdfunding and knowledge that is gained through new experiences in the crowdfunding process. This knowledge improves the crowd's capabilities of evaluating new information about a focal venture opportunity (Cohen and Levinthal 1990). The research looks at both existing knowledge and knowledge development among members of the crowd. First, the crowd is comprised of a large group of individuals that brings with them an existing stock of knowledge from prior experiences. Second, the crowd acquires new knowledge from the experiences they have related to investments made on the crowdfunding

platform. While the existing knowledge that the individuals bring with them to the crowd provides them with some capabilities in identifying opportunities, they can also increase their relevant knowledge associated with new venture investments by learning from prior investments made in equity crowdfunding campaigns. Third, knowledge related to technological opportunities impacts their ability to make investments. Technological opportunities make it more difficult for the crowd to develop and exploit their absorptive capacity because of the special skills and knowledge related to these types of opportunities (Gupta and Sapienza 1992; Norton and Tenenbaum 1993; Sorenson and Stuart 2001).

4.1 Inherited Knowledge

Inherited knowledge likely impacts the absorptive capacity of the crowd because the stock of knowledge that the crowd brings with them makes it possible for the crowd to identify better and exploit the new information provided by a venture's equity crowdfunding campaign. With information asymmetry problems inherent in new venture investments (Amit, Brander, and Zott 1998), the crowd's likelihood of understanding the value of an investment opportunity increases with their ability to recognize and exploit the limited information they have available (Shane 2003). Within a large crowd, the inherited knowledge allows the crowd to better examine investment opportunities when the absorptive capacity derived from their existing knowledge stock is related to the focal venture's opportunity. For example, prior education was found to improve the performance of a venture capitalist because it allowed them to have skills necessary to evaluate investment opportunities in areas related to their education (Dimov and Shepherd 2005). Similarly, the crowd is

likely to have past experiences that allow them to better evaluate opportunities in areas related to those experiences.

When evaluating a focal venture's investment opportunity, the crowd is more likely able to understand investment opportunities when the new venture is in a familiar industry (Sitkin and Pablo 1992; Dimov, de Holan, and Milanov 2012). The crowd is made up of the general public and often considered "unsophisticated" because they lack background characteristics and financial capabilities that are associated with "sophisticated" or "accredited" investors (Smith 2014). However, the crowd is on an equal footing with "sophisticated" investors when the focal venture's opportunity is in an industry that the general public has frequent opportunities to gain experiences, such as retail and food services. Unlike VCs that often specialize in a particular technology or industry because they are unable, with limited resources, to have broad experience about a diverse number of industries and technologies (Tyebjee and Bruno 1984), the crowd is more likely to be familiar with a larger number of industries and opportunities that they frequently experience because the size of the crowd provides larger variations in background characteristics of the members than traditional funding sources. These variations support the ability of the crowd to better identify opportunities in areas that are often shunned by VC and angels. For example, while only 3% of angel investors³ and 7% of investing partners in the top 100 VC firms were women⁴, women made

³ <https://www.crowdcube.com/2013/>

⁴ <https://techcrunch.com/2016/04/19/the-first-comprehensive-study-on-women-in-venture-capital/>

up 27% of the investments made in new ventures through Crowdcube⁵. Where the venture capital industry is overwhelmingly male and tends to select opportunities led primarily by male teams, there is an increased likelihood that women investors within the crowd will understand opportunities that are shunned by VCs and are led by teams of women (Greene, et al. 2001). In addition, 44% of members of the crowd participating on Crowdcube were considered “everyday” investors⁶ and do not qualify as “accredited” or “high net worth” individuals. For example, these types of investors are likely exposed to various different kinds of products and services as consumers or work in levels of organizations that expose them to different customer experiences. These experiences, accessible to the public, improve the absorptive capacity by relying on prior experience in evaluating certain types of new venture opportunities. The crowd is likely to manifest their absorptive capacity through the selection of new venture in areas that they have prior experience which will enhance the prospects for new ventures in certain industries and hinder funding outcomes in other industries (De Clercq and Dimov 2008).

Despite the diversity of backgrounds, there are experiences that are more likely to be shared among members of the crowd. Employment experiences, for example, are likely shared experiences when viewed within an industry group because the industry provides a more uniform knowledge cluster. Typically, an industry is considered to have firms that provide similar knowledge development when it

⁵ <https://www.crowdcube.com/infographic>

⁶ Everyday investors are “restricted investors” under FCA regulations and are not allowed to invest more than 10% of the income in privately held ventures.

comes to information sources like R&D intensity, market size, market growth, and profitability of their industry (Shane 2003).

The crowd is likely to have experiences based on industries that are widely accessible to the public. Industries that employ a larger portion of the population are likely to impact the inherited knowledge of the crowd because there is a greater probability that the members of the crowd have been employed in one of these industries compared to industries that only employ a small portion of the population. In previous venture investment literature, industries played a key role in the decision making of venture capitalists because they were able to derive knowledge useful in reducing the risk of poor investments within particular industries which with they had experience (Amit, Brander, and Zott 1998). The crowd's inherited knowledge of a focal industry makes it easier to resolve information asymmetries because their absorptive capacity improves the ability to evaluate and understand a focal venture's opportunity (De Clercq and Dimov 2008). Because investors will select opportunities where they are more likely to have familiarity (Amit, Brander, and Zott 1998), the crowd is likely to focus on industries where they have more relevant inherited knowledge.

Hypothesis 1: Inherited knowledge will increase the likelihood of equity crowdfunding success.

4.2 Knowledge Development

In new venture investments research, prior investment experience impacted the development of absorptive capacity because it provided access to information that

could be used by investors in future investment decisions (De Clercq and Dimov 2008). Similarly, prior investments made in crowdfunding are likely to increase the absorptive capacity of the crowd because the information from these investments will give the crowd additional understanding about market demands, technology, and profitability that can be used to evaluate new investment opportunities in similar focal areas (Shane 2003).

The development of new knowledge requires repeated experiences in a focal area (Levinthal and March 1993). An investment experience is a valuable mechanism for learning and developing knowledge because it provides the crowd with direct experiences that are enhanced through a form of feedback directly related to the future decision making of the crowd (Huber 1991). Whereas some factors can be studied about the process of investments in new ventures, some of the knowledge necessary to better identify and exploit opportunities can be understood only by executing the investment and learning from the results (Duchesneau and Gartner 1990). Because crowdfunding requires only small amounts of capital to participate (Mollick 2014), there are greater likelihoods that members of the crowd will gain knowledge from prior experiences. A large number of investors is critical for the development of absorptive capacity within crowdfunding because the knowledge gained from prior experiences is tacit and difficult to transfer (Saviotti 1998; Simonin 1999; Szulanski 1996; Kogut and Zander 1993). The transfer of knowledge is especially problematic when there is a lack of routines and processes within an organization for the transfer of knowledge (Zahra and George 2002). Without strong and established routines and processes for transferring knowledge,

the crowd will have a more difficult time developing absorptive capacity capabilities. However, the need to transfer knowledge between members decreases as a large number of investor that participate in investments gain direct experiences that are useful in future investment decisions. These direct experiences provide relevant knowledge that helps the crowd understand and evaluate new opportunities for investment (De Clercq and Dimov 2008; Cohen and Levinthal 1990).

Prior venture capital and angel investment research show that investors make investments in new ventures where they have prior investment experience because they can use their experiences to better understand the quality of a new investment opportunity (Sorenson and Stuart 2001; Van Osnabrugge 2000). Furthermore, the more success a venture capitalist has in previous investments activities, the higher the likelihood that they will invest in the same focal area in the future (Gompers, et al. 2008). These prior investment activities generate knowledge that venture capitalists and angel investors use to improve their absorptive capacity in future investment opportunities. As they continue to invest in specific areas, they gain additional relevant knowledge that benefits decision-making in future opportunities in the same area. As a result, specialization often occurs in the venture capital industry and in some angel investment groups. Similarly, the prior investments made by venture capitalists in areas outside of the focal area of an opportunity decreased the likelihood that the venture capitalist would invest in that industry despite the opportunity's positive potential returns (Gompers, et al. 2008).

When the crowd is evaluating new investment opportunities, they are more likely to understand and evaluate the information when they have had previous

investment experiences related to the focal venture's opportunity. When the investment is in the same category, the derived knowledge from these investment experiences helps the crowd understand the complexity of new opportunities and the new information being presented by the entrepreneurs. The crowd is less likely to resolve information problems using prior investment experiences if the focal venture's opportunity is outside the industry of prior investments regardless of the opportunities potential. The crowd is also likely to benefit from the specialization resulting from frequent investments in particular industries because of knowledge developed from these experiences help them enhance their absorptive capacity.

Hypothesis 2: Prior investment experience by the crowd in a focal area will increase the likelihood of equity crowdfunding success.

4.3 Technological Knowledge

However, when the focal venture's opportunity is also technologically sophisticated, the absorptive capacity of the crowd may not be sufficient to identify and evaluate information about an investment opportunity. Technology is more complex and likely to negatively impact the development of absorptive capacity within the crowd in a situation of technology because understanding technology is more expensive and time-consuming (Afuah and Tucci 2012; Cohen and Levinthal 1990; Galunic and Rodan 1998; Kogut and Zander 1996). Wright and Robbie (1998) argue that information asymmetry problems vary with different levels of technological sophistication because technologies often require specific skills and knowledge to be able to evaluate them. Venture capitalists tend to take the time and expense to specialize in technologies because it provides them with a competitive

advantage (Sorenson and Stuart 2001; Gupta and Sapienza 1992; Norton and Tenenbaum 1993). Although some members of the crowd potentially have expertise about a specific technology that can be used to evaluate the complexity of technological opportunities, this knowledge is less likely to be found among the crowd. Because crowdfunding requires investments from a large number of individuals, this constraint of knowledge to only a few reduces the likelihood that a new venture will be able to raise capital from the crowd.

Because technology decreases the number of crowd members with related knowledge, the crowd is less likely to be able to identify and evaluate opportunities that are more technologically sophisticated in a large enough number to successfully fund the new venture. Furthermore, the technology opportunities are characterized as having more information asymmetries problems. As a result of the information asymmetries and lack of absorptive capacity to evaluate the information, the crowd will likely not invest in opportunities that are technologically sophisticated. Given that crowdfunding relies on small investments from a large number of the investors, the lack of knowledge need to develop a strong absorptive capacity will negatively impact the selection of new ventures that are more technologically sophisticated.

Hypothesis 3: Technological opportunities will decrease the likelihood of equity crowdfunding success.

4.4 Knowledge Decline

While variations in experiences provide the crowd with opportunities to develop absorptive capacity, the knowledge used in the identification and exploitation of new investment opportunities may also erode within crowdfunding because of the lack of coding, systems, or routines for storing and retrieving the valuable knowledge (Huber 1991). While the crowd is likely to gain knowledge useful in making an investment from prior experiences, they are also likely to forget some of the previously gained knowledge that is useful in making investment decisions. Whereas VCs often code information within their organizations to help prevent a loss of knowledge (Dimov, de Holan, and Milanov 2012), the crowd must continually replenish the stock of knowledge because of the lack of systems to store it among members of the crowd. This loss of knowledge will likely have a negative impact on the success of new ventures participating in equity crowdfunding.

Organizations often forget specialized knowledge over time because they lack persistence, experience frequent interruptions, or are delayed in their use of the knowledge (Argote, Beckman, and Epple 1990). In an organizational setting, Argote, Beckman, and Epple (1990) found a rapid decline in available knowledge occurs within an organization when the knowledge is not continually replenished. Given the dynamic nature of organizations (e.g. turnover and production cycles), organizations typically struggle to maintain their valuable knowledge capabilities.

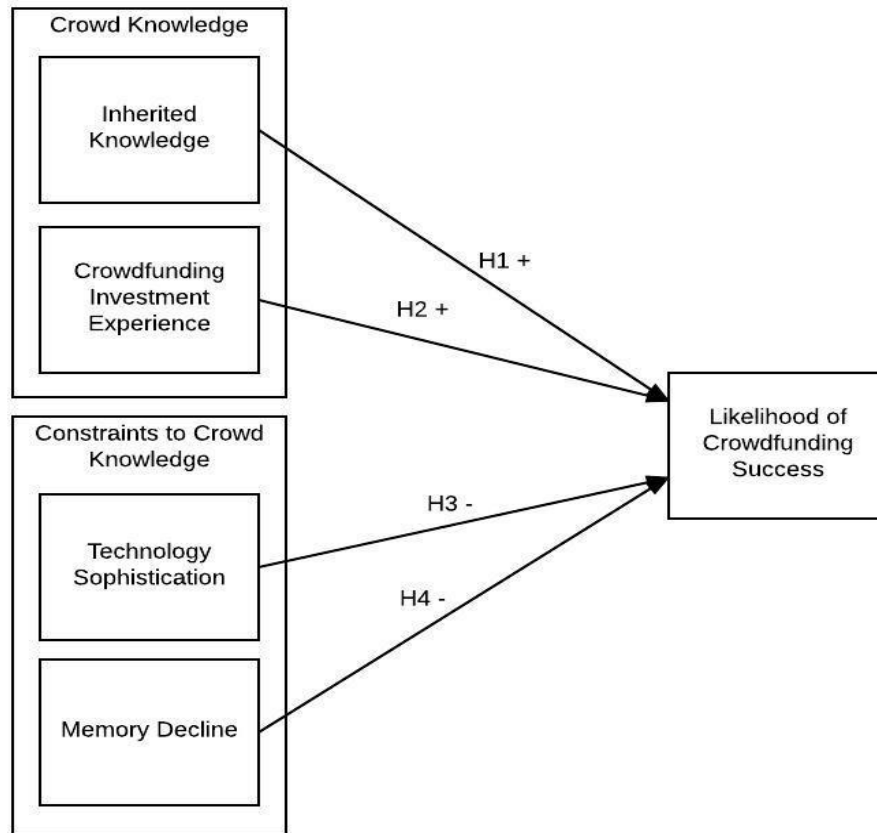
Venture capital research also shows that knowledge developed through the investment process can decline when the information is not frequently used. Dimov, Martin de Holan, and Milanov (2012) found that knowledge gained from making

an investment in early-stage new ventures declined when the VCs made investments in other stages of new ventures. As a result of the decline, the VCs that did not continually replenish the knowledge related to early-stage new venture investments were less likely to make a future investment in early-stage new ventures. When the VCs attention shifted to other stages, the knowledge necessary to identify and exploit opportunities in a highly uncertain condition declined.

The dynamics of crowdfunding also make it likely that there will be a decline in knowledge. In particular, crowdfunding does not have the complex mechanism to transfer and store important knowledge among members of the crowd. Currently, most information shared between investors comes in the form of comments and investment signals (Ahlers, et al. 2015). Furthermore, crowdfunding is also expected to have turnover because investors are investing less capital. In order to maintain the success of crowdfunding, the crowd also needs to continually increase in size to offset the turnover. These characteristics of crowdfunding are likely to negatively impact the absorptive capacity of the crowd through a loss of knowledge. Because there is a decline in knowledge among the crowd, new ventures are less likely to be successful when the crowd is not able to frequently replenish their knowledge.

Hypothesis 4: Declines in knowledge will negatively impact the success of equity crowdfunding campaigns

Figure 1: A knowledge model of equity crowdfunding success



CHAPTER 5. DATA AND METHODOLOGY

5.1 Sample Context

Data on the investment decisions of the crowd was hand collected from Crowdcube Limited, a UK internet equity crowdfunding platform. A UK site is preferable in testing the hypotheses because the laws governing equity crowdfunding in the UK allow for much greater participation by the crowd than is currently available within the United States. Crowdcube Limited is one of the largest equity crowdfunding sites in the UK. In 2014, the platform made available equity offers from 330 new ventures. During 2014, Crowdcube had 1,124,537 individuals visit the site, an average of £139,211 invested per day (£5,800/hour), active investors in 91 countries, and an addition of 61,592 new investors⁷. An account was created online, and each campaign was reviewed for the data used in the analysis. In addition to Crowdcube, data was collected from Company House, a UK government site that provides information about companies registered in the UK. This site provided information about each new ventures' incorporation. Finally, data about employment was also collected from the UK Office of National Statistics.

The dependent variable was taken from new venture campaigns participating on the equity crowdfunding platform starting in August 2015 and continuing until the end of August 2016. A sample size of 177 new ventures that participated in campaigns during the period of data collection was included in this research. The

⁷ www.crowdcube.com/2015 Accessed 11/12/2015

research sample had a success rate of 54.8% and raised over 67 million pounds. The sample included new ventures from 17 different categories selected from options created by the crowdfunding platform, 37 various industries (2 digit SIC) and a range of technology. The sample was able to attract over £67.8 million pounds during the campaign. Given that the crowdfunding site only allowed access to funds if the new venture met their funding goal, the total capital available to successful new ventures was just over £60 million.

5.2 Dependent Variables

Since Crowdcube used an all-or-nothing model of rewarding new ventures that meet their funding goals, SUCCESS was measured as a dichotomous variable with 1 representing new ventures that were successful in meeting their predetermined funding goal and 0 for those new ventures that did not access any capital from the crowdfunding campaign. The success of a campaign was a common measure in crowdfunding literature (Mollick 2014). New ventures were incentivized to select a goal that would help them launch or grow their business. While success meant different things for new ventures with higher or lower goals, the measure in this analysis was used to capture just the success of the equity crowdfunding campaign and not the value of the funds raised for the longer-term performance of the new ventures. In the discussion of control variables, the need to control for funding goals is explained as an important factor in the decisions made by the crowd.

A second dependent variable was used as a robustness check. FUNDING was a continuous variable that measured the number of funds each campaign was able to raise on the equity crowdfunding site. It has also been used in some crowdfunding

literature (Ahlers, et al. 2015). While the platform was an all-or-nothing model and limited access to funds to only campaigns that met their goal, the model was expected to have a similar impact on this variable because investors are likely to invest more capital into new ventures that they better understand.

5.3 Independent Variables

INHERITED knowledge was measured by collecting industry employment data from the general population in the UK and matching the data to the industries of each of the new ventures in our sample. The logic for using industry employment information from the census is to capture the most likely shared experiences of the general public. The reasoning suggests that if there were a larger number of individuals employed in a specific industry than employed in another industry, then the crowd is likely to have a larger amount of knowledge in that industry where more of the general public was employed. To collect the data about industry employment, the 2015 UK census from the Office of National Statistics was retrieved. The census included the total employment of the census population broken down into 20 clusters with an average employment across these clusters of 1.22 million.

After collecting the industry employment information, the measure was calculated following Gompers et al. (2008). The inherited knowledge relevant to industry was measured by taking the ratio of the total number of individuals employed in an industry division and dividing it by the total number of employed in all industry divisions. The divisions were provided in the UK census. Consequently, the ratio is an approximation of the inherited knowledge in the crowd

because it measures the likelihood that the crowd has experience in an industry division. The measure was used to test hypothesis 1. Table 1 includes the divisions, SIC codes, and ratios used in the measure. The more inherited knowledge the crowd has in a specific industry, the more likely they are to invest in that given industry. The top three industry with the greatest approximated inherited knowledge included retail, human health activities, and professional activities. The divisions with the least amount of approximated inherited knowledge included mining, activities of households, and electrical. While the census information does not provide an exact measure of the crowd's inherited knowledge, given the anonymous nature of the crowd, the census was the best available approximation of the crowd's experience because the size of the crowd and the diversity of the crowdfunding opportunities increases the likelihood that the crowd was distributed in their employment opportunities similar to the general public from which the crowd is drawn.

Studies that have used census data to append settings where little information is available (e.g. community health) have suggested that aggregate measures using census data are weaker than measures using micro-level data (Geronimus and Bound 1998). In particular, the measure creates errors-in-variable because the aggregate measure will imperfectly represent the micro-level variable. As a result, there is a possibility for under or over interpretation of the inherited knowledge measure in a non-linear model. However, the size of the sample in this research helps to minimize these concerns.

Table 1: List of Divisions, SIC, and Ratios used in the measure Inherited Knowledge

Division	Name	SIC	Employment (000)	Ratio
A	Agriculture, Forestry, and Fishing	01-03	409	0.012
B	Mining and Quarrying	05-09	70	0.002
C	Manufacturing	10-33	2658	0.078
D	Electrical, Gas, Steam, and Air Conditioning Supplies	34	122	0.004
E	Water Supply, Sewage, Waste Management, and Remediation Services	36-39	209	0.006
F	Construction	41-43	2243	0.066
G	Whole Sale and Retail Trade Including Repair of Motor Vehicles	45-47	4986	0.146
H	Transportation and Storage	49-53	1562	0.046
I	Accommodation and Food Service	55-56	2303	0.068
J	Information and Communication	58-63	1343	0.039
K	Financial and Insurance Services	64-66	1148	0.034
L	Real Estate Activities	68	536	0.016
M	Professional, Scientific and Technical Activities	69-75	2958	0.087
N	Administrative and Support Activities	77-82	2920	0.086
O	Public Administration and Defence	84	1483	0.044
P	Education	85	2943	0.086
Q	Human Health and Social Work Activities	86-88	4208	0.123
R	Arts, Entertainment, and Recreation	90-93	982	0.029
S	Other Service Activities	94-96	927	0.027
T	Activities of Household Employers	97-98	65	0.002

A total of 243 prior investments made by the crowd were taken to develop a measure for EXPERIENCE. The experience measure was used to test hypothesis 2 and measure the knowledge learned from prior investment experiences. The variable was expected to explain how prior investments provided knowledge for the crowd to exploit information about new investment opportunities. Given that prior investments experiences allow access to information that is unavailable to others (Sorenson and Stuart 2001), the prior investments are a source of knowledge developed within the crowd. Similar to the variable measuring inherited knowledge, the measure was designed following Gompers et al. (2008). To create the measure, the variable took the total number of successful campaigns in each of the 17 categories prepared by Crowdcube and divided the total by the total number of successful campaigns. When a new venture creates a campaign, it can select from some categories. The categories differ from industry classification. For example, the category of Food and Beverage falls into a number of different industries like manufacturing of food, manufacturing of beverages, and food services. The ratio was calculated by taking the total number of successful campaigns in a category and dividing it by the total number of successful campaigns in all categories. This measure provides a level of specialization within the crowd based on prior experience in a category. Table 2 provides a list of the 17 categories with their ratio of experience.

Table 2: Categories and Experience Ratios

Art	0.024	Leisure	0.020
Consumer	0.036	Manufacturing	0.100
Education	0.040	Media	0.050
Environmental	0.036	Other	0.020
Film	0.006	Professional	0.100
Food	0.320	Retail	0.050
Health	0.042	Sport	0.020
Internet	0.050	Technology	0.030
IT	0.070		

To measure TECH, two graduate students in businesses independently coded the campaigns into a dichotomous variable with 1 representing new ventures that are technologically sophisticated and 0 for new ventures that were not technologically sophisticated. In general, the coding was based on the amount of technology described within the campaign. New ventures were coded TECH when the campaign description included information about software, apps, algorithms, and patents. After coding 20 cases and resolving differences among the two coders, the remaining cases from the sample were coded. A test of inter-rater reliability showed a strong reliability between raters ($\text{Kappa} = 81.39\%$). Appendix A includes examples of excerpts of campaign pitches and their associated coding. The measure of TECH examines the impact technologies have on the development of absorptive capacity. The measure is used to test hypothesis 3. Because technologies typically require special skills and knowledge to evaluate (Wright and Robbie 1998), the crowd is less likely to be able to select opportunities when they are more technologically sophisticated.

Finally, DECLINE was a measure of the erosion of knowledge among the crowd. In particular, knowledge used in making investment decisions is expected to decline when it is not frequently used and replenished (Argote, Beckman, and Epple 1990). As a result, the crowd is likely to forget specialized knowledge developed through investment experiences when there is a delay in use, a shift in attention, or a turnover of individuals (Argote, Beckman, and Epple 1990; Benkard 1999). The dynamics of equity crowdfunding platforms tend to make it difficult for the crowd to maintain knowledge developed within the crowdfunding process. For example, the crowdfunding platform exacerbates the problem by offering a large number of new campaigns in various different categories at a frequent rate. They likely do this to increase the probability of making a profit since the platform receives a portion of the invested funds when the campaign is successful. This introduction of different types of campaigns makes it more difficult for the crowd to use knowledge because of the delay in use and shift in attention that is detrimental to maintaining knowledge. In addition, equity crowdfunding is likely to have a consistent turnover in the crowd because of the limited amount of capital individuals in the crowd have available to invest in new ventures. Consequently, equity crowdfunding platforms and entrepreneurs need to continually attract new investors into the crowd with capital available to invest. When new investors enter the crowd, they lack the knowledge developed by previous members of the crowd that have left the crowd. This turnover within crowdfunding manifests itself through a decline in useful knowledge among the members of the crowd. To measure decline, the research follows Dimov, Martin de Holan, and Milanov (2012) by looking at each category

and taking the log number of new campaigns that were introduced to the members of the crowd that were outside that category since the last successful campaign in the focal category.

5.5 Control Variables

The research also included several control variables suggested from past research in new venture financing decisions. Research on the feasibility of investments in new ventures (Amit, Brander, and Zott 1998) suggests additional variables that need to be controlled for in our model because they have been argued as salient in the decision-making process of investors. STAGE was a measure of a new venture's stage of business. New ventures that were less than a year old were coded with a 1 and firms older than one year were coded with a 0. Since a large number of new businesses fail and new firms have less of a history for investors to rely on (Wright and Robbie 1998), new ventures in the early stage are likely to impact the investment decisions of the crowd because there are greater information asymmetries.

EQUITY was a measure of the total amount of equity ownership that was made available to investors on the crowdfunding site. The amount of equity offered impacts the decisions of the crowd because when a new venture offers more equity, it allows the crowd to share in more of any future payoff and reduces the risks associated with the investment opportunity (Amit, Brander, and Zott 1998).

Finally, GOAL was a measure of the total amount of investment sought from the crowd by a new venture. This measure provided a proxy for the cost of the investment. The cost of the investment was an important factor in new venture financing because the cost was one of the main variables in determining whether an investment had a positive expected return (Amit, Brander, and Zott 1998).

Table 3: Variable definitions

Dependent variables

Success: A dichotomous variable with 1 representing new ventures that were successful in raising capital through equity crowdfunding and 0 otherwise.

Amount: The total amount of capital raised by a new venture participating in a given equity crowdfunding campaign in £.

Independent variables

Inherited: A ratio of the number of individuals employed in a given industry divided by the total of all industries.

Experience: The ratio of the total number of previous equity crowdfunding investments in a given category divided by the total number of previous equity crowdfunding investments

Tech: A dichotomous variable with 1 representing equity crowdfunding campaigns that are technologically sophisticated and 0 otherwise

Decline: The total number of new campaigns introduced since the last successful investment made in the same industry.

Control variables

Goal: The total amount of capital a new ventures seeks to raise during the equity crowdfunding campaign

Equity: The percentage of equity the new venture is willing to exchange for capital from the crowd

Previous Success: A dichotomous variable with 1 representing new ventures that had previously been successful in an earlier equity crowdfunding campaign

Stage: A dichotmous variable with 1 representing new ventures that were organized less than one year before their campaign start date

5.6 Procedure

Logistic regression was used to regress investment success and failure from the direct effects of *INHERITED*, *EXPERIENCE*, *TECH* and *DECLINE* while controlling for *GOAL*, *EQUITY*, *PREVIOUS SUCCESS*, and *STAGE*. Logistic regression was useful when there was a dichotomous dependent variable. Furthermore, logistic regression was chosen over discriminant analysis because the former method did not require multivariate normality of independent variables (Gilbert, 1993). The model considered the variables to be a probability function that takes a value of 1. The logistic equation is expressed as follows:

$$\ln \left[\frac{P(C_i = 1)}{1 - P(C_i = 1)} \right] = A_0 + X\beta$$

where $P(C_i = 1)$ is the probability that the new venture i will successfully raise capital from the crowd. The β is a vector of the coefficients of the independent variables X . The coefficients in a logistic regression are represented as log odds and tell about the relationship between the independent variables and the dependent variable. In a logistic regression, the dependent variable is on a logit scale. The research uses the following model to test the hypotheses:

$$\ln \left[\frac{P(C_i=1)}{1-P(C_i=1)} \right] = A_0 + \beta_1 INHERIT + \beta_2 EXPERIENCE + \beta_3 TECH + \beta_4 DECLINE + \beta_5 GOAL + \beta_6 EQUITY + \beta_7 PREVIOUS SUCCESS + \beta_8 STAGE$$

As a check on the robustness, a second model that used an alternative measure of success was also analyzed. In this model, the total amounts raised by the

campaigns and not just the success of the campaign was the dependent variable. While the all-or-nothing model determines what campaigns access capital based on achieving the predetermined goal, there was an expectation that the independent variables would also improve the likelihood that a new venture would raise capital regardless of meeting the goal. An OLS regression was used to regress the independent variables on the amount raised by each campaign as a robustness check of the model. The OLS model is expressed as follows:

$$\begin{aligned} Capital_i = & \beta_0 + \beta_1 INHERIT + \beta_2 EXPERIENCE + \beta_3 TECH + \\ & \beta_4 DECLINE + \beta_5 GOAL + \beta_6 EQUITY + \beta_7 PREVIOUS SUCCESS + \\ & \beta_8 STAGE + \varepsilon \end{aligned}$$

CHAPTER 6. RESULTS

Table 4 provides the means, standard deviations, and correlations for the variables used in this research. Table 5 reports the logistic regression and OLS regression coefficients, standard errors, log-likelihood, chi-square and R-squared statistics. In Table 4, several of the variables are significantly correlated. The dependent variable SUCCESS is significantly and positively correlated with INHERITED, EXPERIENCE, GOAL, and PRIOR SUCCESS. The dependent variable is also significantly and negatively correlated with DECLINE. These variables all correlate in the expected direction of the hypotheses. Thus, there is initial support for Hypotheses 1, 2 and 4. Although the variable for TECH also correlates in the correct direction, TECH is not significantly correlated with SUCCESS. While there are a number of statistically significant correlations, all of the correlations have relatively weak associations. Also, the variables were checked for multicollinearity issues by examining the variance inflation factors (VIF). All of the variables are below the acceptable threshold with a range between 1.1 and 1.23.

In Table 5, Model 1 reports the coefficients for all of the control variables used in the analysis. Three control variables are significant in the OLS regression analysis. In the logistic regression analysis, previous success had a high standard error because all of the new ventures that had previous successful campaigns were successful in the sample. To check the impact of the standard error on the results, the analysis was tested with both the previous successful variable included and excluded. There was no difference in the direction or significance of any of the

Table 4: Descriptive statistics and correlations

Variables	Mean	SD	N	1	2	3	4	5	6	7	8	9
1. Success	.548	.499	177	1								
2. Inherited	.095	.052	177	.281**	1							
3. Experience	.107	.110	177	.202**	.041	1						
4. Tech	.469	.500	177	-.148	-.203**	-.372**	1					
5. Decline	.943	.590	177	-.236**	-.203**	-.080	-.021	1				
6. Goal	298316	311508	177	.150*	.003	.021	.056	.003	1			
7. Equity	12.243	7.429	177	-.084	.039	-.038	-.028	-.032	.018	1		
8. Previous Success	.079	.271	177	.266**	.123	.133	.018	.008	.174*	.081	1	
9. Stage	.164	.371	177	-.058	-.059	-.009	-.018	.000	-.157*	-.004	-.130	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

DV Success Rate = 54.8%

Table 5: Results of the logistic regression model and OLS model

Dependent Variable:	Success							Amount Raised (log)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<i>Main Effects</i>								
Intercept		11.12 (3.25)**				9.38 (3.46)**	9.87 (3.30)**	0.58 (0.74)
Experience			3.70 (1.56)*			2.59 (1.73)	3.46 (1.67)*	0.92 (0.38)*
Tech				-0.74 (.33)*		-0.36 (0.37)	-0.20 (0.35)	-0.003 (0.08)
Decline					-0.94 (.29)**	-0.78 (0.31)*	-0.72 (0.29)*	-0.196 (0.06)**
<i>Controls</i>								
Goal	8.33E-07 (0.00)	9.11E-07 (0.00)	9.17E-07 (0.00)	9.86E-07 (0.00)	7.49E-07 (0.00)	9.43E-07 (0.00)		1.32E-06 (0.00)***
Equity	-0.017 (0.02)	-0.025 (0.02)	-0.016 (0.02)	-0.019 (0.02)	-0.024 (0.02)	-0.029 (0.02)		-0.007 (0.00)
Previous Success	22.326 (20915)	22.059 (20266)	22.16 (20019)	22.36 (20170)	22.37 (20225)	22.04 (19699)		0.34 (0.14)*
Stage	-0.037 (0.42)	0.018 (0.45)	-0.045 (0.43)	-0.031 (0.43)	-0.057 (0.01)	0.007 (0.46)		-0.26 (0.10)*
<i>Model Statistics</i>								
Log likelihood	-105.34	-102.87	-108.45	-105.03	-103.76	-98.69	-108.07	
Chi-square	20.852***	33.386***	26.834***	26.195***	32.056***	46.367***	27.59***	
AIC	220.68	217.75	228.90	222.07	219.52	215.37	226.50	
R-square								0.54
N	177	177	177	177	177	177	177	170

***p<0.001, ** p<0.01, *p<0.05

additional variables in the analysis when the variable for previous success was excluded. Previous success was significant and positively related to the amount of money raised in Model 8.

In Table 5, Models 2-5 reported the coefficients calculated using logistic regression to test Hypotheses 1-4. As an additional check, Model 6 includes all of the variables added simultaneously. All of these models showed a significant improvement over the base model. In Model 7, the amount raised was used as the dependent variable to do an additional check of robustness. Because amount raised is a continuous variable, Model 7 relied on OLS regression to report the coefficients. The R-square reported for model 7 was 54%.

6.1 Hypothesis Tests

The research finds strong support for Hypothesis 1. The hypothesis argues that inherited knowledge of the crowd positively influences the probability of a new venture being successful in their equity crowdfunding campaign. There is a positive and significant effect in Model 2 ($\beta = 11.12$, $p < 0.01$) and Model 6 ($\beta = 9.38$, $p < 0.01$). The results indicate that the crowd relies on knowledge from their employment experiences in different industries to help them evaluate, understand and invest in new investment opportunities. The standardized odds ratio suggest that the crowd is more than 1000 times more likely to invest in a new venture when it is related to retail (largest) than investment opportunities in household employment (smallest). As a result, new ventures that are in industries with a larger ratio of inherited knowledge among the crowd are more likely to be successful. In particular, new ventures that are related to the retail industry have the highest

probability of success in their equity crowdfunding campaigns because it is the largest source of inherited knowledge. Conversely, new ventures with opportunities related to industries like real estate and entertainment have the lowest probability of success. Thus, the crowd is more likely to invest in opportunities where they can rely on prior employment experiences related to a focal venture.

Similarly, the research finds support for Hypothesis 2. The hypothesis argues that prior investment experiences on the crowdfunding site would positively impact the probability of a new venture being successful in their equity crowdfunding campaign because the prior experiences provide useful knowledge to evaluate new opportunities in similar categories. Model 3 in Table 5 reports a positive and significant effect of prior experience ($\beta = 3.70, p < 0.05$). An increase in the number of prior investments made by the crowd in the same category of the opportunity increases the likelihood that the new venture will be successful in their campaign. Specifically, the standardized odds ratio suggests that new ventures are 40 times more likely to be successful when they are in opportunities related to highest category (Food) compared with opportunities in the lowest category (Film). While experience is not significant in model 6 which contains all of the variables including the controls, Model 7 in Table 5 shows that experience is positive and significant when the control variables are removed from the regression. Model 7 shows that the control variables expend valuable information in Model 6 in Table 5 but do not provide additional meaning to the specific model because the variables are not significant. To test the impact of the control variables, Model 7 in Table 5 removes the control variables. While the control variables are theoretically justified to be

included in the analysis, they are only significant in Model 8 of Table 5. Consequently, in Model 7, both experience and inherited knowledge are positive and significantly related to the success of a new venture. It is important to note that while inherited knowledge is likely to have some impact on investment experiences because what the crowd knows potentially impacts their investment decisions that become the source of experience, the two variables are not significantly correlated in Table 4 and work simultaneously in Model 7 of Table 5 to explain the variation in success.

The research also finds support for Hypothesis 3, which argues that technologically sophisticated opportunities would negatively impact the crowd's probability of investing in a new venture's campaign because the specialized knowledge necessary to evaluate, understand, and invest in technology opportunities is less likely to be found among the members of the crowd. In Model 4 of Table 5, there is a negative and significant effect of technology on the likelihood of success ($\beta = -0.74$, $p < 0.05$). Specifically, the standardized odds ratio in Model 4 suggests that new ventures with technologically sophisticated opportunities are nearly half as likely to attract investment from the crowd that will make them successful than opportunities that are not technologically sophisticated. While this result supports Hypothesis 3, Tech is not significant in Table 5, Model 6 which includes all of the variables added simultaneously. In Table 5, Model 6 and Model 7, the results suggest that variables related to knowledge and experience among the crowd are likely more important determinants to the success of a new venture's fundraising efforts than the lack of knowledge about a technologically

sophisticated opportunity. Thus, the crowd may discount what they don't know about an investment opportunity while relying more on the value of their knowledge.

Finally, the research finds strong support for Hypothesis 4, which states that a decline in knowledge is likely to negatively impact the probability of success in crowdfunding. There are negative and significant effects in Model 5 ($\beta = -0.94$, $p < 0.01$) and Model 6 ($\beta = -0.78$, $p < 0.05$). The standardized odds ratio suggests that a new venture is nearly half as likely to be funded by the crowd when there is an increase in the number of new campaigns being presented to the crowd since the last investment success in a focal category. As the new investments opportunities are presented, the crowd tends to forget knowledge from experiences they had with a specific focal area that could be used in future investments and the odds of new ventures in the same area decline. New ventures have the highest probability of being successful when their campaign occurs near the same time as a similar successful new venture.

As a check of robustness, the hypotheses were also testing using the total amount raised as the dependent variable. It is expected that there would be similar results using the total amount raised because the amount raised is an important factor in the success of a new venture on equity crowdfunding. However, the amount raised also looks at the model beyond the dichotomous nature of equity crowdfunding's all-or-nothing model. Model 7 in Table 5 report the coefficients for the control and independent variables using an OLS regression. The results report a significant and positive effect for prior investment experience ($\beta = 0.92$, $p < 0.05$), which provides

additional support for Hypothesis 2. There is also support for Hypothesis 4 in the OLS regression. There is a negative and significant effect of the decline in knowledge among the crowd ($\beta = -0.196$, $p < 0.01$). The regression had an R-square statistic of 54%, suggesting that a little more than half of the variance in the model is predicted by the variables. Although the control variables were not significant in the logistic regression, three variables were significant in the OLS regression.

CHAPTER 7. DISCUSSION AND CONCLUSION

7.1 Discussion

This research develops and tests a model to explain the impact of knowledge on the investment behavior of the crowd in equity crowdfunding by arguing that the absorptive capacity of the crowd is critical in the probability that a new venture will be successful in equity crowdfunding. While prior research in crowdfunding and much of entrepreneurial research have focused on the capabilities of the entrepreneur and characteristics of the campaigns (Burns, et al. 2015; Moritz and Block 2016), this research takes the crowd as the starting point in explaining the types of equity crowdfunding campaigns that get funded. In particular, the analysis supports the model that absorptive capacity of the crowd plays a critical role in the funding outcomes of new ventures because the knowledge capabilities it employs helps investors make decisions in uncertain conditions where information asymmetries exist. In particular, the knowledge capabilities of the crowd provide it an advantage in reducing the uncertainty of an equity investment in areas that are familiar to it. This research focuses on equity crowdfunding as the context for understanding how crowd makes investment decisions in uncertain new ventures. While this research only focuses on one type of crowdfunding, the framework is useful in research related to other forms of crowdfunding. The study offers several important contributions to theory and practice.

7.2 Contributions and Implications

By drawing on the well-developed absorptive capacity construct from organizational learning theory, the research contributes to the literature by showing that the crowd can learn and development knowledge that can be used to identify and exploit investment in new ventures. The crowd faces differing dynamics compared to traditional organizations that have systems and routines to develop, store and transfer knowledge. Consequently, the crowd develops an absorptive capacity to understand investment opportunities by relying on experiences and knowledge they develop individually but manifest collectively through the selection of new venture investments. It is the group's collective knowledge capability that is used to successfully select opportunities for investments. Given the abundance of information asymmetry problems in new venture investments, it is essential that the crowd use knowledge in their investment decisions. In this research, there are two knowledge mechanisms that are significantly related to the success or failure of an equity crowdfunding campaign. Existing stocks of knowledge that the crowd brings with them from their employment and knowledge developed while participating on the crowdfunding platform both provide useful capabilities to evaluate new investment opportunities. However, two mechanisms also restrict the knowledge capabilities. Specifically, technology sophisticated opportunities and knowledge decline reduce the available knowledge among the crowd in their decision making. The research supports previous literature in new venture investment decisions that argued that knowledge would play a major role in the decision making in new venture investments by showing that a crowd

behaves in a predictable manner despite the lack of strong organizational systems (De Clercq and Dimov 2008).

The results of the analysis suggest that new ventures participating in an equity crowdfunding campaign have a higher probability of getting funded when the crowd has existing knowledge related to the opportunity. In particular, the crowd develops an absorptive capacity from prior industry experiences that they use to identify and exploit information about the investment opportunity. This finding offers an alternative to the assumption that the crowd lacks the knowledge to make investments in new ventures with large amounts of information asymmetries because knowledge capabilities among the crowd allow them to reduce these asymmetries (Amit, Brander, and Zott 1998; Smith 2014). Prior research argued that venture capitalists and angel investors were more capable of making investments in new ventures because of their knowledge (Lerner 1994). However, this research empirically supports the use of knowledge by the crowd in their investment decisions and suggests they are also capable of making investment decisions in new ventures when they have knowledge related to the investment opportunity.

In addition, the research suggests that there is likely a difference of investment knowledge capabilities between VCs and the crowd. Whereas VCs concentrate in areas that their knowledge provides a competitive advantage in their due diligence techniques and efficiencies (De Clercq and Dimov 2008) such as software, biotechnology, and the internet (Gompers and Lerner 2001; Amit, Brander, and Zott 1998), the crowd's capability allows them to specialize in industries where

their knowledge can play a critical role such as retail and food services. While individuals in the crowd are not likely to have a greater degree of knowledge compared with individual venture capitalists and angel investors in industries like food and retail, the collective knowledge that forms an absorptive capacity provides the crowd with a unique mechanism for resolving information asymmetries in these types of industries. By sharing common knowledge from industry experience, the crowd is able to reduce information asymmetries and uncertainty related to those specific industries. In contrast, the individual knowledge of a venture capitalist or angel investor is potentially less likely to resolve the information asymmetries necessary to make the investment in this type of new venture because the types of uncertainty that are likely important in these industries are less likely to be resolved through traditional due diligence technique. For example, it is impossible for an investor to resolve uncertainty regarding a food product's demand by mere analysis. However, a crowd with an absorptive capacity related to the opportunity is more likely to deduce the demand and reduce uncertainty because the collective decision making in a well understood food product decreases this type of uncertainty. In contrast, the crowd is less likely to be able to resolve information asymmetries related to high tech industries because they lack prior experiences that provide knowledge necessary to reduce the different types of uncertainty found in these industries. However, VCs and angels that specialize in high tech industries are likely to have absorptive capacity capabilities that provide a competitive advantage for reducing information because their knowledge about the industry helps resolve certain types of uncertainty. The types of industries

pursued by VCs compared with the crowd are likely different because of the variances in how each of their knowledge capabilities help resolve the uncertainty of the investment.

The results also show support for prior investment experiences as a source of knowledge used among the crowd for investment decisions. Specifically, the crowd is more likely to select opportunities in the same categories as previous investments. While specialization is also true in the VC industry, venture capitalists typically have a very narrow specialization, whereas, the crowd can have many areas of specialization because of their size. As a result, a type of specialization develops among the crowd in some different categories. The results add to existing literature by arguing that learning from investment experiences in crowdfunding will affect the selection of opportunities of the crowd by providing new knowledge that can be used in the evaluation of investments in the same category. While venture capital literature has studied the link between prior investment experiences and new venture investment decisions (De Clercq and Dimov 2008; Sorenson and Stuart 2001), research in equity crowdfunding had not determined how the crowd used prior investment experiences. This research shows that the crowd's ability to rely on prior investment experience in the selection of investment opportunities is an important contribution to understanding what types of opportunities are likely to be successful on equity crowdfunding.

There is also strong empirical support for the decline in knowledge used among the crowd between investments. Specifically, evidence from the research suggests the idea that the crowd is less likely to make investments in areas where they have

previous experiences as new and varying opportunities are presented to the crowd. The value of the knowledge gained from identifying and investing in an opportunity may be quickly lost by the crowd because of the lack of systems to store and transfer the knowledge (Kogut and Zander 1996). Once knowledge is gained, there is no guarantee that it will remain because of the dynamic nature of crowdfunding. For example, the crowd is likely to have turnover in the members that limits the usefulness of previous investment experiences. While venture capital literature suggests the importance of experience and knowledge (De Clercq and Dimov 2008), the development of knowledge is offset by the loss of knowledge. This implication is essential for crowdfunding because it suggests that the success or failure of new ventures is partially determined by the ability of the crowd to replenish the knowledge they gain from prior experiences.

7.3 Implications for Technology Opportunities

In the analysis, the research found empirical support for the impact of technology on the decision of the crowd. The argument provided in the research suggested that because technology is harder to understand for investors without specialized knowledge and skills, they are less likely to invest in a new venture that is technologically sophisticated (Junkunc 2007; Gupta and Sapienza 1992). While there is statistical significance in one of the models, technology is not supported in any other model. This limited support for the technological sophistication of new venture suggests that the selection of new venture investments is likely to rely more on what the crowd knows about a new venture's opportunity than what they may not know about a technology. As a result, technology does not remain significant

in the models where inherited knowledge and experience are included. While relying on what the crowd knows is an important factor in the decision making of the crowd, the discounting of what they don't know may have an impact in the future performance of the crowd.

The lack of significance in some of the models may also partially attributed to two factors found in the sample of equity crowdfunding. First, some descriptions of technology in the new venture investment literature suggest that technology sophistication in the investment decisions is impacted by the stage of the technology. In particular, that technology impacts the investment decisions differently when it is in different stages of development because the information asymmetries that influence decisions are greater in early stages of technology compared with later stages of the technology. Early stage technologies are more uncertain and more difficult for investors to evaluate for investors because the technology lacks a track record useful in decision making. However, in the sample, there was not a large variation in the stage of the technology. Most technologies in the crowdfunding campaign were existing technologies with long track records that could be used by investors to better understand the investment opportunity. Second, some research also suggests that technologies increase the amount of capital invested in a new venture because technology is assumed by investors to provide a greater probability for a much higher payoff (Townsend and Busenitz 2015; Bygrave and Timmons 1992). Thus, the crowd may make investment decisions in technologies based on the probability that these opportunities may have greater payoffs than on their understanding of the opportunity. Future research will benefit

from looking at technology opportunities that are at different stages of development because these stages impact the risk and uncertainty of the opportunity.

Consequently, new ventures participating in equity crowdfunding that have technologically sophisticated opportunities may still find it harder to raise money from the crowd. This empirical result is in sharp contrast to the thinking of venture capitalists and angel investors that often specialize in technologies and industries that seek opportunities that are technologically sophisticated (Amit, Brander, and Zott 1998; Junkunc 2007).

From a practical point of view, crowdfunding may be better suited for the less technologically sophisticated opportunities because the crowd is better able to understand and reduce information asymmetries in these types of opportunities. In addition, venture capitalists and angel investors often ignore these kinds of opportunities because their specialized knowledge may be less competitive in resolving the types of uncertainty that are important in these types of investments. As a result, their competitive advantage is less likely to help them find opportunities that offer sufficient returns when they are in types of industries that do not require technological knowledge. In contrast, the crowd fills this gap by providing financial resources to new ventures that are often avoided by venture capitalists and angels and are more likely to be familiar to the crowd. While these opportunities might not provide the same financial returns as an investment in technology, they are easier to evaluate given the knowledge capabilities of the crowd.

7.4 Implications for Crowdfunding

The research also contributes the emerging literature on crowdfunding (see Moritz and Block 2016) by showing that the knowledge capabilities of the crowd have a critical impact on the funding success. Whereas most research in crowdfunding has focused on the entrepreneur and the content of the campaign, this research adds to the literature by focusing on characteristics of the crowd. With a focus on the crowd, some researchers have begun to look at topics including, for example, herding, (Kim and Viswanathan 2014), geographical limitations (Ahlers, et al. 2015) and social relationships (Liu, et al. 2015). However, this research is the first to look at how knowledge of the crowd impacts equity investment decisions. In addition, this research looks at the emerging equity crowdfunding as its context for understanding the investment decisions. Most research in crowdfunding to date has used other types of non-equity crowdfunding as the context because the availability of data in equity crowdfunding is harder to obtain.

7.5 Implications for Practice

Since equity crowdfunding relies on contributions from a large number of individuals (Mollick 2014), the findings suggest that the crowd needs to continually replenish the stock of knowledge used to identify and evaluate opportunities for investment to keep a large knowledge base actively participating in the crowd by attracting new members or by increasing the knowledge base of incumbent members. Furthermore, crowdfunding platforms would potentially benefit from mechanisms that allow the crowd to develop and store knowledge. For example, the crowdfunding site could provide a forum for questions and answers

to be discussed among members of the crowd. Additional resources that allow the crowd to follow and track prior opportunities would possibly serve as a tool for additional capability development.

From an entrepreneur's perspective, crowdfunding can act as a viable source of external capital when the new venture's opportunity is in areas that are more familiar to the crowd. Also, they will achieve the highest probability of success when the opportunity is less technologically sophisticated, so the crowd has less uncertainty in their investment decision. There is also support for entrepreneurs to time their campaigns because timing a campaign at the same time as another new venture within a similar area improves the likelihood that they will attract the knowledge base from the crowd to improve their performance in crowdfunding.

7.6 Limitations and Future Research

This research is not without limitations. First, the theory argues that the crowd's knowledge is critical in understanding the types of opportunities that are successful in equity crowdfunding. One limitation of studying the crowd is that the identities of the individuals that are participating are not available to researchers. Consequently, the research is unable to use measurements of knowledge at the micro level. However, this limitation has been noted as a common constraint of empirical studies of organizational learning mechanisms (Dimov, de Holan, and Milanov 2012). In prior studies of the theory, the measurements were often not directly observed, but characteristics of the organization were ascribed to the patterns observed in the data.

While there is support for these types of measures, this assumption may only be true when there is a large crowd participating and when the platform does not specialize in any particular type of new ventures. Where there is specialization in the types of new ventures a crowdfunding platform lists on their site, there would be an assumption that the members that select into that crowd would have more relevant knowledge to the types of opportunities being made available to them. In this research, the sample is taken from one of the largest platforms in the world with a high variation in types of new ventures participating and a large crowd. Future research would benefit by testing the model developed in this research to other crowdfunding platforms. While this research only tests equity crowdfunding, the model may also be tested in other types of crowdfunding (e.g. reward-based) to increase the generalizability of the model.

Second, there is a limitation in the use of success or failure as a dependent variable because it does not capture the long-term performance of the new venture. Given the short history of crowdfunding throughout the world, the research uses the success as the dependent variable to look at the performance of the new venture only in the capital acquisition process. The measures used for success of a new venture in most crowdfunding research relied only on the new venture reaching their funding goal or some other measure that excluded any information of the future realization of the opportunity (e.g. Allison, et al. 2015; Mollick 2014). While this is a limit to testing if the knowledge allows the crowd to select opportunities with a higher probability of payoff, a new venture that is successful at raising capital increases their likelihood of success in the future (Bates 1995; Carroll and Hannan

2000; Taylor 2001). Future research can follow new ventures that have participated in crowdfunding in the past to determine better the quality of the opportunities that are being funded and separate failure from quality opportunities from failure from poor management. Future research can also compare the effectiveness of the crowd in selecting high-quality opportunities compared to other specialized venture capitalists and angel investors.

Another source of potential research opportunities in the future is to examine longitudinally how the crowd's knowledge changes over time as the crowd grows larger and more diverse. This research examines inherited knowledge and prior investment experiences of the crowd as important factors in decision-making. However, there are important implications to this model as the crowd grows larger and more diverse (March 1991). For example, as the crowd grows larger, there may be more and more individual investors with special skills and knowledge to evaluate more technologically sophisticated opportunities than a smaller crowd of investors. Since crowdfunding relies on a large number of investors, but not the entire crowd to make an investment feasible, it is probable that a large enough group of investors with special skills and knowledge can join the crowd and improve the likelihood that opportunities with more technology are successful. While this may be the case, they may also see that there is less of an incentive for these types of investors to join a crowd due to the opportunity for less knowledgeable members of the crowd to free-ride (Amit, Brander, and Zott 1998; Sorenson and Stuart 2001). These types of investors may be more likely to form specialized equity crowdfunding platforms to benefit from their shared knowledge and reduce the risk

of free-riding (Lerner 1994). Future research might also find that as the crowd gets bigger, it becomes less discriminating in their decisions because there will be more money chasing fewer opportunities.

Future research in equity crowdfunding would also likely benefit from exploring the types of uncertainty inherent in new venture investments that the crowd is likely to have an advantage over alternative forms of new venture financing. While prior research has suggested that VCs and angels often maintain a competitive advantage because of their absorptive capacity related to a specific industry, the crowd is likely to maintain a competitive advantage because their absorptive capacity about an opportunity helps reduce information asymmetries and uncertainty that is more difficult to assess without the use of a large, knowledgeable crowd. Large and diverse crowds are more likely to make accurate prediction about how a product will be received by the broad market than a small group of VCs or angels. Future research can explore how the crowd's absorptive capacity gives them a superior capability to resolve certain types of uncertainty.

Finally, the article only looks at equity crowdfunding in the discussion of the crowd and raising capital to exploit opportunities. There are many types of crowdfunding besides equity crowdfunding (Belleflamme, Lambert, and Schwienbacher 2013; Belleflamme and Lambert 2014). The model developed in this article may be used to test other types of crowdfunding and the effectiveness of the crowd in funding opportunities. For example, Allison and colleagues (2015) show that investors that participate on crowdfunding platforms that focus on micro-lending opportunities seek to find the highest quality opportunity although they are

expecting no return on investment. Despite the lack of potential for financial gain, they do not simply invest in any opportunity but look for an opportunity with the highest potential for the entrepreneur. The theory developed in this article can help explain what types of opportunities these investors will choose even with differing motivations by showing that these investors will invest in opportunities that have the lowest risk of adverse selection among members of the crowd that distribute salient information.

7.7 Conclusion

This research is the first to assess how knowledge capabilities among the crowd impact the success or failure of new ventures participating in equity crowdfunding. Unlike previous assumptions about the crowd's lack of capabilities in making new venture investments, the results suggest that the crowd, despite its dynamic nature, follows patterns related to their knowledge capabilities. For the crowd, the results also suggest the need to continually replenish the stock of knowledge so that there is not a harmful decline in the capabilities of the crowd. Future research will benefit from a more micro-level assessment of the knowledge of the crowd if the crowd's identity is eventually made available. Finally, for entrepreneurs, the research suggests that their likelihood of success in equity crowdfunding improves the more their opportunity matches the knowledge of the crowd. In particular, opportunities that are familiar to the public are more likely to be successful.

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Appendix A: Examples of Technology Coding

Excerpts From New Venture Pitches, Technology Coding, and Success or Failure	Tech	Success
Savvy is a delicious and nutritious food source, designed as the perfect breakfast and snacking food and a much healthier sweet spread option. The Savvy range was inspired by a time-honoured sweet dip of tahini and carob syrup, which our founder Jonathan fell in love with while exploring Turkey in the '90's. Carob (<i>Ceratonia siliqua</i>) was revered by many ancient cultures for its energy-enhancing and even medicinal properties. He brought the recipe home, sharing it with friends and family led to experiments with other ingredients such as honey, spices, cocoa and dates and Savvy was born	0	1
LUMO design beautifully made jackets and bags that have ultra-high brightness LEDs subtly incorporated behind fabric panels. The lights are waterproof, washable and powered by a small detachable USB-rechargeable battery unit. The LEDs are completely concealed until they are switched on, then visible from up to 400 meters when illuminated. LUMO also uses quality fabric technology and cycling-friendly design with the aim of ensuring that cyclists are kept dry, their temperature is moderated, and they are comfortable riding their bike.	0	1
FieldCandy is an exciting design-led brand of tents and outdoor lifestyle products. We inject colour, creativity and fun into the outdoor space by offering a range of totally unexpected designs. We aim to delight our customers and excite anyone who sees our products. FieldCandy has traded since Dec 2011, designing and manufacturing our growing range in our dedicated facility in Derbyshire, and selling worldwide via our website www.fieldcandy.com , high end retailers and B2B channels.	0	1
The Scorpion Light is a flexible, affordable and extremely portable lighting solution for the film, television and content creation market. In one box you have four lights and all the powering and mounting accessories you could ever need. Lighting has never been so easy. Designed to be the most versatile LEDs on the market Light anywhere and everything.	0	0

At BorrowMyDoggy, we connect dog owners with local dog lovers across the UK and Ireland for walks, sitting and happy holidays. Through BorrowMyDoggy matches, dogs enjoy extra one-on-one attention and exercise, borrowers get to have fun, happy dog time without the full-time responsibility and owners have peace of mind that their dog is being taken care of by someone who is local, verified, insured, and wants to help out simply because they love dogs, not to get paid.	0	0
Travelling with a family can be stressful. It is a high stakes game – both financially and emotionally. Family Traveller, the core brand of Ardent Media, provides highly curated, useful and trusted information, and advice about travelling with a family. Via our different platforms (i.e. digital content on our website, emails, online shop, and our bi-monthly magazine) mid to high affluent consumers can gather practical ideas and inspiration covering all family sizes, ages, and destinations. The company has generated in excess of £1.5m revenues since launch in 2012, and is raising capital to continue its UK growth, launch our digital platform in the US, and further develop retail channels for selling holidays and related products.	0	0
Snugs custom fit earphones are one of the first consumer earphone that are made exclusively for your ears that not only eliminate all of the problems of generic earphones but are also totally personalisable. Our 3D image scanning process is designed to ensure Snugs fit perfectly ... 3D printing technology is advancing rapidly. Through our manufacturing partner, Dreve Otoplasik GmbH use the latest industrial, medical grade, 3D printers to make Snugs.	1	1
Big Sofa is a technology platform for managing visual content. It provides an elegant solution for managing and analysing large volumes of video and images by making it simple to securely upload, curate, mine, share, tag and comment on any kind of visual content. It works on content in any language, from any device in any country.	1	1

<p>Lingos takes advantage of this opportunity to bring together the value of person-to-person language learning with the growth of online courses. We believe that Lingos will be successful in opening up language learning to digital teaching. Lingos has a simple mission: To enable language learners around the world to learn directly from language teachers through online courses and private lessons. Lingos is a simple platform for mobile and online that empowers teachers to benefit from a transparent marketplace. On Lingos, language teachers market their courses and manage students; learners purchase digital courses, book offline lessons and find other students to practice with. Teachers build their own businesses and students choose to learn in whichever manner suits them best. Lingos charges a commission on all transactions.</p>	1	1
<p>Shirtly is a London based software company facilitating on demand shirt cleaning by connecting premium cleaning and delivery providers through a simple intuitive mobile app. We have built our own technology from ground up and looked at reducing and removing steps for our users, aiming to make ordering pick up and delivery is as smooth as ordering an Uber or indeed from a service providers side of things as easy as reading a text.</p>	1	0
<p>Activinsights produces wearable device to help healthcare professionals monitor and collect objective data about the lifestyles of their patients (sleeping, walking, exercise, sitting etc.). One week of wear provides enough data to help a general practitioner with differential diagnosis – it is designed to be an effective, low risk intervention. Lifestyle reports are instantly available to share with the patient. Wearables are also a tool for the management of long-term conditions such as diabetes. The Activinsights Band, designed for primary healthcare use, is provided for £200 a year complete with data services (secure with privacy-by-design) - it is wireless, does not need charging and is fully waterproof.</p>	1	0

<p>Social Marley will be the new social media dashboard for small but forward-thinking businesses who want to build a successful social media presence. Our product plan enables: Seamless integration of some of the most commonly used social media networks into one central hub meaning accounts can all be managed in one place. Businesses will be able to schedule posts, engage with their audiences and analyse their Facebook, Twitter, Google Plus, LinkedIn (and more) accounts, all from one dashboard, helping to enable a constant brand identity throughout the Internet. Social Marley aims to be affordable for small businesses Users will have access to invaluable analytical reports on their social media activity and progress at no additional cost beyond the subscription.</p>	1	0
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